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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/646,292	08/22/2003	Oksana Penezina	57315 (45858)	9380

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EXAMINER	
VO, HAI	

ART UNIT	PAPER NUMBER
1794	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/646,292	PENEZINA ET AL.	
	Examiner	Art Unit	
	Hai Vo	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-3,5-22,48 and 50-60* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-3,5-22,48 and 50-60* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

1. The 112 claim rejections have been withdrawn in view of the present amendment and response.
2. The art rejections based on Callahan et al (US 4,976,897) are maintained.
3. The art rejections based on Witham et al (US 6,193,077) are maintained.
4. The art rejections over Charkoudian et al (US 2003/0077435) and Remigy et al (US 2002/0161066) separately have been overcome in view of the present amendment. None of the applied references teach or suggest a difunctional acrylate monomer.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

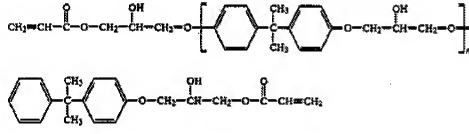
Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 1-3, 5-19, 21, 22, 48, 50-52, and 55-57 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35

U.S.C. 103(a) as obvious over Callahan et al (US 4,976,897). Callahan teaches a composite porous membrane comprising a hydrophobic substrate coated with a UV curable resin material. The hydrophobic substrate is polyethylene membrane having a pore size of 0.02 to 0.04 μm (column 3, lines 30-35). The photocatalyst is 2-hydroxyl-2-methyl-1-phenyl-propan-1-one (column 3, lines 62-63). Callahan teaches the UV curable resin comprising Celrad 3700-20T which is a composition of 20% trimethyol triacrylate dilution of dicracylate ester bisphenol A epoxy resin. Both trimethyol triacrylate and dicracylate ester bisphenol A epoxy resin are difunctional acrylate monomers which are crosslinkable. The dicracylate ester bisphenol A epoxy resin has the formula:



Callahan discloses the UV curable resin material further comprising an acrylic acid, and dimethylaminoethyl methacrylate which reads on Applicants' negatively charged group and positively charged group respectively. There is no pore plugging upon coating and curing (abstract). Likewise, the pore sizes of the coated composite porous membrane are substantially the same as the pore size of the composite porous membrane before coating. Similarly, it is expected that the flow

rate through the pores of the coated membrane is substantially the same as the flow rate through the pores of the non-coated membrane as the pore size of the membrane is substantially preserved after coating. Since the dicracylate ester bisphenol A epoxy resin meets all the structural limitations and chemistry as described in the claims, it is the examiner's position that the preferential association properties and wetting characteristics would be inherently present as like material has like property. The dicracylate ester bisphenol A epoxy resin is consisting of a difunctional acrylate monomer, wherein the difunctional acrylate monomer comprises 100% of the molecules associated with the membrane. The UV curable coating material comprises diacrylate ester of bisphenol A epoxy resin present in an amount of 1 to 99 wt% (column 3, lines 50-55 and column 4, lines 50-55). Callahan discloses the amount of the UV resin could be used down to 1 wt%, which reads on Applicants' "less than about 1 wt%" because to the examiner, "about" means ± 10% of the range, namely less than 1.1 wt% or less than 0.9 wt%. Alternatively, since the concentration is recognized as a result-effective variable, differences in concentration will not support the patentability of subject matter encompassed by the prior art unless there is evidence indicating such concentration is critical or provides unexpected results. Therefore, in the absence of unexpected results, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the UV resin in an amount of less than 1 wt% in view of cost effectiveness,

permeability/selectivity of the coated membrane. This is in line with *In re Aller*, 105 USPQ 233 which holds discovering the optimum or workable ranges involves only routine skill in the art.

Callahan does not specifically disclose the membrane is autoclavable and the processing steps set out in claim 50. However, they are product-by-process limitations not as yet shown to produce a patentably distinct article. It is the examiner's position that the article of Callahan is identical to or only slightly different than the claimed article prepared by the method of the claim, because both articles are formed from the same materials, having structural similarity as discussed above. Even though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or an obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process. *In re Thorpe*, 227 USPQ 964, 966 (Fed. Cir. 1985). The burden has been shifted to the applicant to show unobvious differences between the claimed product and the prior art product. *In re Marosi,* 218 USPQ 289,291 (Fed. Cir. 1983). It is noted that if the applicant intends to rely on Examples in the specification or in a submitted Declaration to show non-obviousness, the applicant should clearly state how the Examples of the present invention are

commensurate in scope with the claims and how the Comparative Examples are commensurate in scope with the membrane of Callahan.

8. Claims 59 and 60 are rejected under 35 U.S.C. 103(a) as being unpatentable over Callahan et al (US 4,976,897). Callahan discloses the porous membrane having an average pore size ranging from 0.005 to 0.2 microns. Callahan adds that the pore size may vary as dependent upon its intended use in a particular separation process (column 3, lines 33-35). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use the porous membrane having an average pore size in the range instantly claimed because the pore size may vary as dependent upon its intended use in a particular separation process. This is in line with *In re Aller*, 105 USPQ 233 which holds discovering the optimum or workable ranges involves only routine skill in the art.

9. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Callahan et al (US 4,976,897) as applied to claim 1 above, and further in view of Steuck et al (US 4,618,533). Callahan does not specifically disclose the microporous substrate being polyvinylidene fluoride. Steuck, however, teaches a porous membrane for use in separation comprising a porous membrane including polyethylene and polyvinylidene fluoride (column 2, lines 60-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to

substitute polyvinylidene fluoride for the polyethylene of the Callahan invention since two polymers have been shown in the art to be recognized equivalent porous membranes in separation processes.

10. The art rejections over Callahan have been maintained for the following reasons. Applicants contend that Callahan fails to teach the surface-modifying material on the inner surface of the pores. The arguments are not found persuasive for patentability because nothing in the claims requires the difunctional acrylate monomer on the inner surface of the pores. The mere recitation that reagent solution is capable of flowing through the substrate is not necessary to indicate that the inner surface of the pores coated with difunctional acrylate monomer. Callahan will be removed as prior art if such a limitation is incorporated into the claim. Further, Applicants aver that the viscous coating material would block the pores and the pore size of the coated membrane would not be substantially the same as the pore size of the uncoated membrane. That is not true. Since the pores of the membrane is not filled by the coating material (abstract), the pore size of the coated membrane must be the same as the pore size of the porous membrane before coating. Accordingly, the art rejections are sustained.

11. Claims 1-3, 5-9, 12-17, 19, 21, 22, 48, and 58-60 are rejected under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Witham et al (US 6,193,077). Witham teaches a composite porous membrane comprising a hydrophobic

substrate coated with difunctional surface-modifying molecules. The hydrophobic substrate is polyethersulfone membrane having a pore size of 0.1 to 20 μm (column 4, lines 28-30). The difunctional surface-modifying molecule comprises ethoxylated bisphenol A diacrylate which is present in an amount of 0.1 to 0.7 wt% (column 4, lines 50-52, column 5, lines 26-30). Witham discloses polymerization of the polyfuncitonal monomers causing the corresponding polymer to attach to the polyethersulfone membrane and the polyethylene oxide to form a non-extractable surface (abstract). Likewise, the polymerization of the polyfuncitonal monomers forms a crosslinked hydrophilic polymeric network consisting of the difunctional surface-modifying molecules at the surface of membrane. There is no pore plugging upon coating and curing (column 4, lines 5-8). Likewise, the pore sizes of the coated composite porous membrane are substantially the same as the pore size of the composite porous membrane before coating. The flow rate through the pores of the coated membrane is substantially the same as the flow rate through the pores of the non-coated membrane (table 1). Since Witham was using the same material for the difunctional surface modifying molecule as Applicants, it is the examiner's position that the preferential association, wetting characteristics would be inherently present. Witham discloses that the membrane is autoclavable (column 4, lines 10-15). Accordingly, Witham anticipates or strongly suggests the claimed subject matter.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of Steuck et al (US 4,618,533). Witham does not specifically disclose the microporous substrate being polyvinylidene fluoride. Steuck, however, teaches a porous membrane for use in filtration comprising a porous membrane including polyether sullfone and polyvinylidene fluoride (column 2, lines 60-65). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute polyvinylidene fluoride for the polyethersulfone of the Witham invention since two polymers have been shown in the art to be recognized equivalent porous membranes in filtration processes.

13. Claims 18, and 50-57 are rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of Hu et al (US 5,209,849). Witham does not specifically disclose the use of a photoinitiator to achieve polymerization of the monomers over the entire surface of the membrane. Hu, however, discloses the use of DROCUR ® 1173 as a photoinitiator to achieve polymerization of the monomers over the entire surface of the membrane. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use UV treatment to achieve polymerization of the monomers over the entire surface of the membrane because UV treatment and plasma treatment have been shown in the art

to be recognized equivalent treatments to impart hydrophilicity to a hydrophobic porous membrane.

14. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of Wu et al (WO 00/50161). US 6,780,327 will be relied on as an equivalent form of WO 00/50161 for convenience. Witham does not specifically disclose the crosslinked coating having been modified with a positive charge. Wu, however, teaches a porous membrane for use in filtration comprising a porous membrane and a crosslinked acrylic coating having a pendant cationic group linked to the backbone of the coating (column 4, lines 1-5, 30-40). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use a coated membrane comprising a cross-linked coating that has fixed negative charges motivated by the desire to provide the coated membrane suitable for filtration of fluids containing negatively charged materials.

15. Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Witham et al (US 6,193,077) as applied to claim 1 above, and further in view of WO 00/50160. Hou et al (US 6,783,937) will be relied on as an equivalent form of WO 00/50160. Witham does not specifically disclose the cross-linked coating having been modified with a negative charge. Hou, however, teaches a porous membrane for use in filtration comprising a porous membrane and a cross-linked acrylic coating having fixed negative charge (abstract). Therefore, it would have been obvious to one

having ordinary skill in the art at the time the invention was made to use a coated membrane comprising a cross-linked coating that has fixed negative charges motivated by the desire to provide the coated membrane suitable for filtration of fluids containing positively charged materials.

16. The art rejections over Witham taken individually or in combination with several references have been maintained for the following reasons. Applicants contend that Witham fails to teach the difunctional acrylate monomer comprising greater than about 90% of the molecules associated with the membrane. The examiner respectfully disagrees. In the first place, the arguments are completely irrelevant to the recitation set out in the claim. The claim does not require the difunctional surface modifying molecules be a blend of PEO and difunctional acrylate monomers. Secondly, The examiner notes that Witham's difunctional surface-modifying molecules consist of 100% difunctional acrylate monomers. Likewise, the difunctional acrylate monomer comprises 100% of the molecules associated with the membrane. Applicants further aver that the coating composition comprising the high molecular weight PEO would not be capable of flowing through a porous substrate having a pore size ranging from 0.01 to 10 microns. That is not true. The examiner invites Applicants' attention to column 4, lines 5-8 and column 5, lines 53-56 of Witham. The diacrylate monomer is polymerized into a crosslinked polymer coating over ***the entire surface*** of the membrane that would include an inner surface of the pore and there is ***no reduction in void***

volume of the substrate after polymerization. In addition, the flow rate through the pores of the coated membrane is substantially the same as the flow rate through the pores of the non-coated membrane (column 5, lines 55-57). This at least indicates that the pore sizes of the coated composite porous membrane must be the same as the pore size of the composite porous membrane before coating so as to keep the flow rate unchanged before and after coating. Thirdly, Applicants assert that "Witham's coating compositions require both a high molecular weight polyalkylene oxide (PEO) and a polymerizable polyfunctional monomer in order to impart permanent water wettability to Witham's membranes without restricting flow rate and without cracking." Applicants then conclude that Witham does not teach or suggest the subject matter set forth in claim 58. Applicants are absolutely right that the PEO causes the resulting membrane not to crack during cutting and folding. However, nowhere does the original disclosure contemplate, teach or suggest cracking as a novel property of the composite porous membrane of the present invention. Likewise, the inclusion of PEO in the coating material does not materially affect the novel or basic characteristics of Applicants' invention. Finally, in accordance with the teachings of Whitham, the flow rate through the pores of the coated membrane is substantially the same as the flow rate through the pores of the non-coated membrane in the presence of the PEO. Turning to the specification of the present invention, the flow rate through the pores of the coated membrane

remained unchanged in the absence of the PEO. This at least indicates that the PEO does not materially affect the characteristics of Applicants' invention, namely the flow rate through the pores. Therefore, Applicant bears the burden in establishing that non-recited components materially change the characteristics of Applicants' invention (MPEP 2112; *In re Delajarte* 143 USPQ 256) in order to overcome the issue of anticipation. Accordingly, the language "consisting essentially of" is treated as "comprising" until Applicants provide the evidence in establishing that the PEO materially change the characteristics of Applicants' invention.

Conclusion

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Hai Vo whose telephone number is (571) 272-1485. The examiner can normally be reached on Monday through Thursday, from 9:00 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on (571) 272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Hai Vo/
Primary Examiner, Art Unit 1794